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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,939	03/23/2005	Willem Coene	NL 020930	6584

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EXAMINER

RIZK, SAMIR WADIE

ART UNIT PAPER NUMBER

2133

DATE MAILED: 12/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/528,939	COENE ET AL.	
	Examiner	Art Unit	
	Sam Rizk	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,11-15,20 and 22-27 is/are rejected.
- 7) ☒ Claim(s) 3-10,16-19,21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 March 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>2/23/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTIONS

- Claims 1-27 have been submitted for examination
- Claims 1,2,11-15,20,22-27 have been rejected
- Claims 3-10,16-19, 21 are objected to.

Drawings

1. The drawings are objected to because descriptive labels other than numerical are needed for figure 1. See 37 CFR 1.84(o). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 24-26 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 24-26 have not been further treated on the merit.

Information Disclosure Statement

3. The information disclosure statement filed 3/25/2005 (non patent literature documents) fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy **(in English)** of each cited foreign patent document; **each non-patent literature publication** or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 112

4. Claims 12, 13 and 14 recite the limitation "**the square type**" in claim 12 and the limitation "**the hexagonal type**" in claim 13 and the limitation "**said hexagonal cluster**" in claim 14. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1,2,11,12-14,20,22,23 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coene US patent no. 6580766 B1 (Hereinafter Coene) as applied to claim 1-27 above, and further in view of Fukumoto et al. US patent no. 5191571 (Hereinafter Fukumoto) and further in view of Agazzi et al. US patent no. 6253345 B1 (Hereinafter Agazzi)

5. In regard to claim 1, Coene teaches;
 - Partial response maximum likelihood (PRML) bit detection method for detecting the bit values of bits of a channel data stream stored on a record carrier comprising application of a row-based one-dimensional Viterbi bit detection method independent for each of the bit rows of said channel tube, wherein;
 - calculation of the branch metrics for all possible state transitions in a Viterbi trellis of a one-dimensional row-based Viterbi detector, said transitions representing a number of subsequent bits in said bit row, Selection of the bit value for the central bit of said cluster of the N-

dimensional lattice bits, corresponding with said received HF signal value, is based on the calculated branch metrics.

(Note: Claim 6 in Coene)

However, Coene does not teach that;

- The N-dimensional channel tube, N being at least two, of at least two bit rows one-dimensionally evolving along a first direction and being aligned with each other along at least a second of N-1 other directions, said first direction together with said N-1 other directions constituting an N-dimensional lattice of bit

Nor does Coene teaches;

- said bits being the central-row bits of a cluster of the N-dimensional lattice of bits, is based on the difference of the received HF signal value with respect to a reference level, wherein said reference level depends on all bits of said cluster, said cluster comprising in addition to the central-row bits a number of primary neighboring bits in each of a number of neighboring bit rows on each side along said N-1 other directions of said central bit row along which the one dimensional Viterbi bit detection method is applied, and wherein preliminary bit decisions for the primary neighboring bits in the neighboring for determining the reference level to be used bit rows are used for calculating said branch metrics.

Fukumoto, in an analogous art, of tracking control method for an optical disc system teaches (Note: Col. 13, lines (8-35) and figures (14 and 15) in Fukumoto) high density recording systems comprise n pairs pits being spaced $1/2n$ of the track pitch in the radial direction of the optical disc. (also note: col. 13, lines (55-60) in Fukumoto)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Coene with the teaching of Fukumoto to include teaching of detecting N-Dimensional Lattice which are shifted $1/2N$ of the track pitch.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the need to high density recording carrier.

6. In regard to claim 2, Coene and in further view of Fukumoto substantially teach all the limitations in claim 1.

However, Coene/Fukumoto do not teach;

- The preliminary bit decisions bits on said primary neighboring bits in the neighboring bit rows are obtained by threshold detection using a slicer level.

Agazzi, in an analogous art, of Trellis decoding in a multi-pair transceiver system teaches the Viterbi slicer in figure 6, reference character (604).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Coene/Fukumoto with the teaching of Agazzi to include teaching of threshold detection using a slicer level.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the need to include details of Viterbi decoding.

7. Claims 11,22,23 and 27 are rejected for the same reasons as claim 1.
8. In regard to claim 12-14 and 20, Coene and in further view of Fukumoto substantially teach all the limitations in claim 1.

However Coene/Fukumoto do not teach;

- the 2D lattice of bits is of the square type,
- the 2D lattice of bits is of the hexagonal type, Said channel strip comprises at least three bit rows and wherein said hexagonal cluster comprises seven bits, three being located in the central bit row and two being located in an upper and lower primary neighboring bit row, respectively, or
- wherein, N is 3 yielding a three-dimensional lattice of bits.

William Weeks et al., (Hereinafter Weeks) in an analogous art, teaches the capacity and coding gain of certain checkerboard codes (In IEEE transaction on information theory, vol. 44, no. 3, May 1998) (Copy attached in its entirety):

(Note: Fig. 1, page 1194 in Weeks teaches 2D Lattice of square type, Hexagonal type and hexagonal cluster comprises seven bits (the top middle reference) .

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Coene with the teaching of Coene/Fukumoto to include teaching of Weeks including the 2D Lattice of square type, Hexagonal type and hexagonal cluster comprises seven bits capacity and coding gain (s).

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the need to optimize the channel capacity and coding gain(s).

Allowable Subject Matter

9. Claims 3-10, 15 and 16-19 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

The present invention pertains to a Viterbi bit detection method for detecting the bit values of bits of a channel data stream stored on a record carrier along an N-dimensional channel tube, N being at least two, of at least two bit rows one-dimensionally evolving along a first direction and being aligned with each other along at least a second of N-1 other directions, said first direction together with said N-1 other directions constituting an N-dimensional lattice of bit positions, comprising application of a row-based one-dimensional Viterbi bit detection

method independent for each of the bit row of said channel tube. To achieve reliable bit detection a number of independent one-dimensional row-based Viterbi bit detectors, also known as sequence detectors, is used one for each bit rows in the channel tube: the interference between successive neighboring bit rows is taken into account via the computation of the branch metrics (for the considered bit rows, in which local bit decisions on the primary neighboring bits in the neighbouring rows are used.

Claim 3 recites various features:

wherein the bit values of the central row constituting each of said branches in the Viterbi trellis of the central row are used for determining the preliminary bit decisions on said primary neighboring bits the neighboring bit rows.

The prior Art of record and, in particular Coene/Fukumoto/Agazzi/Weeks, teach a method for a partial response maximum likelihood (PRML) bit detection of N-Dimensional spatial record carrier.

However, the prior Art are not concerned with and do not teach the method of the central row used for determining the preliminary bit decisions on said primary neighboring bits the neighboring bit rows as taught by claim 3 and its base and intervening claims.

Hence the prior Art taken alone or in any combination fail to teach the claimed novel feature in claim 3 in view of its base and intervening claims.

Claims 4-10,16-19 and 21 are allowed for the same reasons as claim 3.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Mita et al. US patent no. 6337889 B1 teaches partial response demodulating method and apparatus.
- Hayashi US publication no. 2002/0093892 teaches optical disk and information reproducing apparatus.
- Ino US patent no. 6347390 teaches data encoding method and device, data decoding method and device, and data supply medium.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Rizk whose telephone number is (571) 272-8191. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

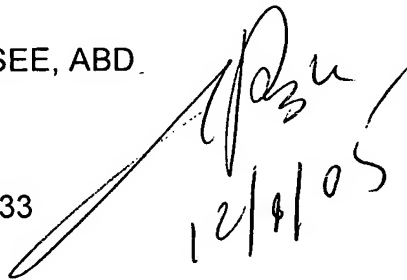
Art Unit: 2133

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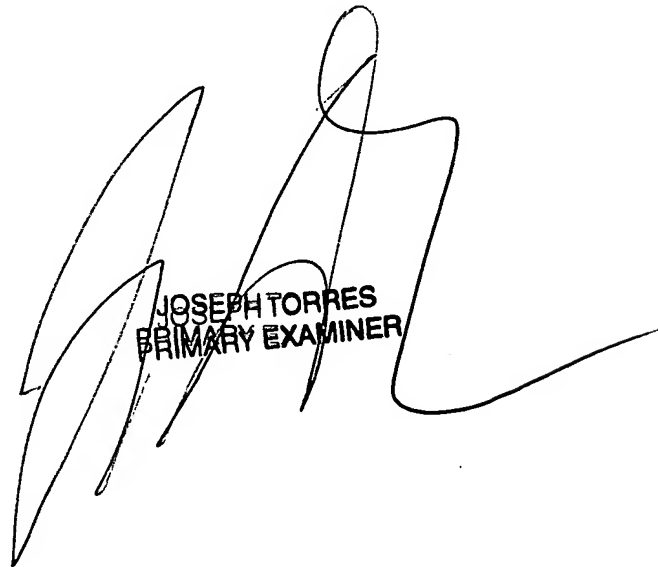
Sam Rizk, MSEE, ABD

Examiner

ART UNIT 2133



12/1/05



JOSEPH TORRES
PRIMARY EXAMINER